

STANDARDIZATION OF NORTH DAKOTA CREAMERY BUTTER

By

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The outlook for expansion in dairy production for the North Dakota farmer appears favorable. Aside from milk needed to supply a population of about 550 thousand people in the state with fluid milk, cream, cottage cheese and ice cream, the bulk of the milk is separated on the farms and most of the cream is manufactured into creamery butter. The importance of North Dakota as a butter producing state is evidenced by a total production of about 50 million pounds of creamery butter with an approximate value of 40 million dollars. Approximately 31 million dollars of this amount goes back to the farmer.

Progressive growth of the butter industry in North Dakota will depend upon: (1) the production of butter of high quality and (2) economical and efficient processing and marketing. In view of these objectives it was believed that a periodic laboratory service would enable butter manufacturing plants to obtain a periodic laboratory analysis of the butter, together with suggestions for adequate control would be of considerable benefit to the butter industry. Obviously, such a service would be of greater value to the small plants which are not large enough to afford their own laboratory service.

Thus, the butter standardization project, a public service project, was begun in May 1945 under the joint sponsorship of the following agencies: (1) North Dakota Research Foundation, (2) North Dakota Agricultural Experiment Station, (3) North Dakota Agricultural Extension Service and (4) Participating butter manufacturing plants.

Of the 26 original participating plants, 25 are still active co-operators. During 1947, 36 creameries located in various sections of the state participated in the project. These manufacturing plants represent about 40 percent of the butter manufactured in North Dakota.

The creameries submit five pound samples of butter monthly, to the experiment station laboratory for analysis. The samples are taken from the regular churning of butter, thus being representative of the product regularly made by the plants. A manufacturing record accompanies each sample of butter, these are of value for diagnostic purposes. In the laboratory each sample of butter is subjected to a variety of chemical and microbiological tests and is scored for fresh quality and keeping quality. A monthly report of the analyses, together with suggestions for overcoming specific problems is sent to each plant.

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Butter Quality

The importance of high quality in butter cannot be over-emphasized. Stimulation of the production of such butter is one of the principal objectives of the standardization project.

The butter samples are graded by qualified butter graders. One of them is usually an accredited Federal grader. The samples are graded first when fresh and again after a storage period of approximately one month, at 40° to 50° Fahrenheit.

A survey was made of the fat tests of 929 samples of butter obtained from 25 co-operating creameries over a period of 41 months. Table 1 gives the percentage distribution of the fresh butter scores at the three following levels: (a) below 90, (b) 90 and (c) above 90 score.

Table 1. Percentage distribution of fresh butter scores

Co-operators Numbers	No. Plants	Number of Samples	Butter samples in per cent ranged from
A. Butter below 90 score			
1, 2, 9, 12, 15, 16) 13, 25, and 31)	9	344	0 to 9.9
6, 10, 19, 21, 26,)) and 28)	6	231	11.8 to 19.5
3, 4, 5, 7, 8, 11,)) 23, and 29)	8	277	21.4 to 28.2
17 and 20)	2	77	35 to 62.2
Average of	25	929	17.5
B. Butter, 90 score			
1, 18, 20, 5, 7, and 9)	6	232	21.1 to 48
4, 17, 23, and 28)	4	146	53.8 to 57.5
3, 6, 10, 11, 15,)) 16, 19, and 29)	8	314	61 to 69.2
2, 8, 12, 25, and 26)	5	165	71 to 78.5
21 and 31)	2	72	82.3 to 84.2
Average of	25	929	59.6
C. Butter above 90 score			
8, 17, 20, 21, and 26)	5	179	2.5 to 7.5
2, 3, 6, 10, 11, 12)			
19, 23, 29, and 31)	10	378	10.3 to 19.5
4, 5, 7, 15 and 25)	5	168	21.9 to 25.0
16 and 28)	2	74	30.6 to 34.2
1, 9, and 18)	3	130	50.0 to 73.6
Average of	25	929	22.8

A. Butter samples below 90 score. The percentage distribution of the fresh butter samples scoring below 90, show that from 9 plants, less than 10 percent of the samples were in this group; with 6 plants from 11.8 to 19.5 percent were in this classification; among the samples from 8 factories, from 21.4 to 28.2 percent were below 90 score and from 2 plants the butter of this grade amounted to 35.0

and 62.2 percent of the samples scored. On the basis of 929 butter samples, 17.5 percent scored below the 90 score level.

B. Butter samples, 90 score. The percentage distribution of fresh butter scores at the 90 grade level showed that among the samples from 9 plants, from 21.1 to 48.0 percent were of 90 score quality; with samples from 4 plants, from 53.8 to 57.5 percent obtained this score; from 8 factories, 61.0 to 69.2 percent of the butter was also at this quality level; while with 5 of the plants, from 71.0 to 78.5 percent of the samples, and from 2, the percentage of 90 score butter was 82.3 and 84.2 percent. Of the total number of samples (929), 59.6 percent of them scored above 90 points.

C. Butter samples above 90 score. The percentage distribution of butter scores above the 90 score level demonstrated that with the butter from 5 plants, from 2.5 to 7.5 percent of the samples were at this level; with butter from 10 plants, from 10.3 to 19.5 percent of the samples were in this class; from 5 creameries 21.9 to 25.0 percent of the butter scored above 90 points; while with 2, from 30.6 to 34.2 percent of the samples were this score and with 3 plants, the butter scoring above 90 was from 50.0 to 73.6 percent of the samples scored. Of the 929 butter samples judged, 22.3 percent scored above 90 points.

From the data in Table 1 it is apparent that a significant proportion of the butter samples scored were of inferior quality as evidenced by the average percentage of them which were below the 90 score level. Also, the percentage of samples of this type of butter varied widely with the different plants. With some of the plants the percentage of below 90 score butter samples submitted were comparatively small, while in some instances, butter of this quality constituted a relatively large percentage of the total number scored.

The greatest proportion of fresh butter samples scored were in the 90 score range. Again, the proportion of this type of samples showed considerable variation, with the different plants.

Butter in the above 90 score range showed similar variations among individual plants in regard to the percentage of the total samples, as evidenced with the 89 and 90 score samples. However, the average percentage of samples scoring above 90 was somewhat higher than the percentage of below 90 score butter.

Discussion

Butter scoring below the 90 score level is definitely regarded as inferior butter on the market. This type of butter is characterized by pronounced flavor defects indicative of inferior quality cream, faulty processing, or both. Butter in the 90 score possesses flavor defects which are not as pronounced, nor as serious in character as that of a lower grade. It is typical of butter made from sour cream, or of cream which has been held on the farm for a sufficient period of time to lose its fresh quality. Butter scoring above 90 may possess relatively slight defects, as compared with the lower scoring

butter and typical of the kind made from fresh sweet cream with no foreign flavors (93 score), to that which would possess minor flavor defects.

In order to eliminate butter of inferior quality, the production and sale of high quality cream should be encouraged and the marketing of poor quality raw material should be discouraged. To this end the following recommendations are offered:

1. A statewide cream quality educational program among the producers should be instituted.
2. Institution by the dairy industry of an effective cream grading program, designed to eliminate cream of inferior quality for butter manufacturing purposes.
3. Establishment of a price incentive sufficient to induce the cream producer to produce and market cream of high quality.
4. Vigorous enforcement of cream grading laws by the proper regulatory agencies.
5. Consumer education relative to the merits of butter of high quality.

1948 HATCHERY SUMMARY

The Poultry Improvement Board, Roy D. Carlson, Executive Secretary, has recently released its 1948 Hatchery Summary. Those desiring to obtain a complete copy should address The Poultry Improvement Board, Bismarck, North Dakota. Significant data indicating the status of the industry in the Hatchery year 1947-48 follows: total number of hatcheries, 55; number under supervision of Poultry Improvement Board, 55; total capacity, 4,138,755, of which 100% is under supervision of the Poultry Improvement Board; number of chicks hatched by North Dakota hatcheries, 4,740,455; number of birds in breeding flocks, 202,260; number of breeding flocks, 1,172; average size of breeding flocks, 173.

The percent of pullorum in these flocks at last test was .67%, significantly lower than in previous years. The number of birds in the mortality survey was 221,049, of which 6,213 or 2.81% were dead at the end of three weeks. The sale of breeds by percentages of total sales in order of popularity in 1948 was as follows: White Rocks, 31.4%; White Leghorns, 25.6%; New Hampshire, 18.5%; White Wyandottes, 1.9%; Barred Rocks, 1.7%; Buff Orpingtons, 1.4%; Rhode Island Reds, 1.2%. Cross bred accounted for 15.1% of sales and others, 3.7%.

Chicken sexing is becoming of increasing importance in North Dakota. The percentage of chicks sexed of total chicks hatched is reported by years as follows: 1943, 4.9%; 1944, 8.9%; 1945, 11.7%; 1946, 14.4%; 1947, 20.1% and 1948, 22%. (Data abstract by H. L. Walster).